

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

MEMORANDUM

MU96-0250

Permit Number P101704

January 31, 1997

TO: External Distribution

THRU: Dennis Turner, Supervisor *DLT*  
Water Protection Approvals and Permits Section - Mining Unit

FROM: Shirin Tolle, Project Officer *ST*  
Water Protection Approvals and Permits Section - Mining Unit

RE: Florence Project  
Individual Aquifer Protection Program Permit  
Permit #101704

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The purpose of this memorandum is to transmit the public noticed draft of the attached Aquifer Protection Program permit and Executive Summary for BHP Copper Co's Florence Project. This permit was public noticed on January 31, 1997. Please review this permit and send your comments, if any, to me prior to the end of the 30 day public comment period which ends on March 2, 1997. In order for your comments to be considered, they must be submitted to me prior to March 2, 1997. You may FAX your comments to me at (602) 207-4674 prior to mailing.

Comments may be mailed to me at the following address:

Shirin Tolle  
Water Protection Approvals and Permits Section - Mining Unit  
Arizona Department of Environmental Quality  
3033 N. Central Ave.  
Phoenix AZ 85012

If you have questions or would like to inform me of your intention to comment, please call me at (602) 207-4622 or toll free within Arizona at 1-800-234-5677, ext. 4622.

cc: External Distribution List  
Greg Olson - US Environmental Protection Agency Region IX  
Sam Spiller - US Fish and Wildlife



Michael Greenslade - AZ Department of Water Resource  
Steve Hildreth - AZ Department of Land, Environmental Resources Unit  
Attn: Water Quality Analyst - AZ Department of Game and Fish  
Bill Hawes - AZ State Mine Inspectors Office  
Pinal County Health Department  
Nancy Marcanti - Central Arizona Council of Governments  
Glenn W. Stark - Gila River Indian Community  
John Kline - BHP Copper Co. Inc.  
Paul Felix

Attachment:

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STATE OF ARIZONA  
AQUIFER PROTECTION PERMIT NO. P-101704

EXECUTIVE SUMMARY  
January 31, 1997

**Facility Name:** Florence Project.

**Location:**

The Florence Project is located approximately 2.5 miles northwest of the Town of Florence, Arizona in Pinal County, Arizona.

**Facility Description:**

BHP Copper Co. will design, construct and operate the Florence Project, utilizing injection and recovery wells for the solution mining of copper. The injection and recovery wells to be used at the Florence Project are classified as Class III wells by the underground injection control (UIC) regulations under 40 C.F.R § 146.4. The Florence Project will consist of the *in-situ* solution mining operation, a solvent extraction/electrowinning (SX/EW) plant, process solution ponds, raffinate processing facilities, stormwater run-on/run-off facilities, evaporation ponds and ancillary facilities. The Florence Project will produce an average of about 72.6 million pounds of copper cathode per year during an operating life of 15 years.

The Florence Project is located on 10,000 acres owned by BHP Copper Co. northwest of the town of Florence, Arizona and approximately one half mile north of the Gila River. The specific portion of the company's property to be solution mined by *in-situ* leaching covers about 300 acres of oxide mineralization at a depth of 400 to 1,600 feet below ground surface (bgs). The PLS and raffinate pond will cover an area of one acre each. The eight evaporation ponds will cover a total area of 96 acres. All mining operations will be outside the 100 year floodplain of the Gila River. The Florence Project facilities will not discharge to surface waters. The Aquifer Protection Program (APP) permit issued to the Florence Project allows no discharge to subsurface waters from the individually permitted PLS pond, raffinate pond, evaporation ponds or stormwater run-off pond. The SX-EW facility and all tanks, ditches or other ancillary surface facilities have been designed not to discharge and are exempt from APP permit requirements. The APP permit requires the Florence Project to maintain hydraulic control over the *in-situ* mining solutions during mine operation, closure and post-closure to ensure that aquifer water quality standards are met at the points of compliance.

The *in-situ* mining area will consist of discrete mining blocks that will be solution mined sequentially. Solution mining will consist of the injection of dilute sulfuric acid solution (raffinate) into the oxide ore body. Recovery wells will pump the recovered solution (PLS) into the PLS pond and subsequently into the SX-EW facility for the production of copper cathode. The stripped PLS solution from the SX operation (raffinate) will be re-injected into the *in-situ* mine. Prior to re-injection, the Florence Project will decrease the concentration of sulfate in the raffinate by 'bleeding' a portion of the raffinate to the evaporation ponds and replacing with clean water. Lime added to the raffinate bleed stream will neutralize it prior to discharge to the evaporation ponds. The evaporation ponds will store the semi-solid precipitates from the neutralized raffinate on-site.



THE STATE OF NEW YORK

IN SENATE, January 12, 1909.

REPORT OF THE

COMMISSIONER OF THE LAND OFFICE

FOR THE YEAR 1908.

ALBANY:

THE STATE OF NEW YORK, 1909.

ALBANY: JAMES B. LEE, PRINTERS.

THE STATE OF NEW YORK, 1909.

THE STATE OF NEW YORK, 1909.

THE STATE OF NEW YORK, 1909.

### **Best Available Demonstrated Control Technology (BADCT):**

The Florence Project will consist of several facilities determined to be discharging under the Arizona Revised Statutes. Specific facilities to be constructed, operated, and closed under this permit include:

- *In-situ* Mining Area:  
Class III injection and recovery wells
- Plant Site Impoundments:  
PLS Pond  
Raffinate Pond  
Run-off Pond  
Evaporation Ponds

The APP permit addresses the design, construction, operation, and closure activities of the above facilities. The APP permit states specific information regarding design, construction, operation, and closure activities for each facility in Part II.C. Information presented in the APP permit application and subsequent submittals supports the identified facilities as meeting BADCT.

### **Compliance with Aquifer Water Quality Standards (AWQS):**

The Florence Project shall maintain hydraulic control over the *in-situ* mining operation within the aquifer exemption boundaries established by the Environmental Protection Agency (EPA). The Florence Project shall establish hydraulic control by monitoring groundwater gradients, water quality and rates of solution injection and recovery. After mining, the Florence Project will rinse each mining block with formation water until the groundwater meets AWQS. As part of the APP permitting process, BHP Copper Co. conducted an extensive groundwater modeling effort to predict the behavior of sub-surface solutions within the *in-situ* mine. The results of the modeling indicate that the Florence Project can prevent the migration of mining solutions outside the aquifer exemption boundaries by manipulating injection and recovery rates. ADEQ and EPA have established a comprehensive groundwater monitoring program to ensure that the Florence Project does not exceed Aquifer Water Quality Standards (AWQS) at the points of compliance.

### **Monitoring Requirements:**

The APP permit requires groundwater and operational monitoring according to Part IV, Tables I through V. The Florence Project will monitor groundwater quality at the points of compliance for the duration of the post-closure period. To ensure proper performance, the APP permit requires operational monitoring for the *in-situ* mine and process impoundments.





**Points of Compliance (POC):**

The APP permit requires groundwater monitoring at 31 POC monitoring wells. Each well is designated as both a hazardous and non-hazardous POC. The APP permit establishes Alert Levels and Aquifer Quality Limits for each of the POCs based on baseline monitoring.

**Stormwater and Surface Water Considerations:**

The Florence Project will contain and control the run-on and run-off from a 100-year 24-hour storm event so that no contaminated stormwater will discharge from the site. The run-off pond will contain all stormwater run-on within the facility.

**Zoning Requirements:**

Mines are exempt from zoning requirements pursuant to A.R.S. § 11-830.

**Financial Capability:**

BHP Copper Co. has demonstrated adequate financial capability.

**Technical Capability:**

BHP Copper Co. and the personnel responsible for the design, construction, operation, and closure of the Florence Project have demonstrated adequate technical capability.

Page 1 of 1

The first part of the document is a list of the names of the people who were present at the meeting. The names are listed in alphabetical order.

The second part of the document is a list of the topics that were discussed during the meeting.

The third part of the document is a list of the actions that were taken during the meeting. The actions are listed in chronological order.

The fourth part of the document is a list of the people who were responsible for the actions.

The fifth part of the document is a list of the people who were present at the meeting.

The sixth part of the document is a list of the topics that were discussed during the meeting.

The seventh part of the document is a list of the actions that were taken during the meeting.

The eighth part of the document is a list of the people who were responsible for the actions.

The ninth part of the document is a list of the people who were present at the meeting.

The tenth part of the document is a list of the topics that were discussed during the meeting.

**STATE OF ARIZONA**  
**AQUIFER PROTECTION PERMIT NO. P-101704**

**EXECUTIVE SUMMARY**  
**June 3, 1997**

**Facility Name:** Florence Project.

**Location:**

The Florence Project is located approximately 2.5 miles northwest of the Town of Florence, Arizona in Pinal County, Arizona.

**Regulatory Status:**

The proposed Florence Project mine is a new facility as defined under Arizona Revised Statute (A.R.S.) § 49-201.21. Underground mining activities at the site were operated by Conoco during the 1970s. Because the Conoco operations closed prior to 1986, no groundwater protection permit (GWPP) or notice of disposal (NOD) was issued for these activities.

**Facility Description:**

The Florence Project will consist of several facilities determined to be discharging under the Arizona Revised Statutes. Specific facilities to be constructed, operated, and closed under this permit include:

- *In-situ* Mining Area:  
Class III injection and recovery wells
- Plant Site Impoundments:  
PLS Pond  
Raffinate Pond  
Run-off Pond  
Evaporation Ponds

BHP Copper Co. will design, construct and operate the Florence Project, utilizing injection and recovery wells for the solution mining of copper. The injection and recovery wells to be used at the Florence Project are classified as Class III wells by the underground injection control (UIC) regulations under 40 C.F.R § 146.4. The Florence Project will consist of the *in-situ* solution mining operation, a solvent extraction/electrowinning (SX/EW) plant, process solution ponds, raffinate processing facilities, stormwater run-on/run-off facilities, evaporation ponds and ancillary facilities. The Florence Project will produce an average of about 72.6 million pounds of copper cathode per year during an operating life of 15 years.

The Florence Project is located on 10,000 acres owned by BHP Copper Co. northwest of the town of Florence, Arizona and approximately one half mile north of the Gila River. The specific portion of the company's property to be solution mined by *in-situ* leaching covers about 300 acres of oxide

mineralization at a depth of 400 to 1,600 feet below ground surface (bgs). The PLS and raffinate pond will cover an area of one acre each. The eight evaporation ponds will cover a total area of 96 acres. All mining operations will be outside the 100 year floodplain of the Gila River. The Florence Project facilities will not discharge to surface waters.

The individual Aquifer Protection Program (APP) permit issued to the Florence Project allows no discharge to subsurface waters from the PLS pond, raffinate pond, evaporation ponds or stormwater run-off pond. The SX-EW facility and all tanks, ditches or other ancillary surface facilities have been designed not to discharge and are exempt from APP permit requirements. The APP permit requires the Florence Project to maintain hydraulic control over the *in-situ* mining solutions during mine operation, closure and post-closure to ensure that aquifer water quality standards are met at the points of compliance.

The *in-situ* mining area will consist of discrete mining blocks that will be solution mined sequentially. Solution mining will consist of the injection of sulfuric acid solution (raffinate) into the oxide ore body. Recovery wells will pump the recovered solution (PLS) into the PLS pond and subsequently into the SX-EW facility for the production of copper cathode. The stripped PLS solution from the SX operation (raffinate) will be re-injected into the *in-situ* mine. Prior to re-injection, the Florence Project will decrease the concentration of sulfate in the raffinate by 'bleeding' a portion of the raffinate to the evaporation ponds and replacing with clean water. Lime added to the raffinate bleed stream will neutralize it prior to discharge to the evaporation ponds. The evaporation ponds will store the semi-solid precipitates from the neutralized raffinate on-site.

#### **Best Available Demonstrated Control Technology (BADCT):**

The APP permit addresses the design, construction, operation, and closure activities of the above facilities. The APP permit states specific information regarding design, construction, operation, and closure activities for each facility in Part II.C. Information presented in the APP permit application and subsequent submittals support the identified facilities as meeting BADCT.

#### **In-Situ Mining Operation:**

BADCT for the *in-situ* mine consists of hydraulic control over the injected solutions. Hydraulic control will be maintained in the *in-situ* mine during the operating life of the mine. The rates of injection and recovery will be continuously monitored and controlled so that the total volume of solution recovered will be greater than the volume of solution injected, averaged over 24 hours. Automatic controls and alarms will be used in the well field to ensure that process upsets do not result in the loss of hydraulic control. Hydraulic control will be confirmed by the use of production observation wells located on each side of an active mining block, or combination of active mining blocks. The operation of the recovery wells and adjacent observation wells will be monitored as described in Section II.E of the APP permit.

#### PLS and Raffinate Ponds:

The PLS and raffinate ponds will be lined with a double liner system consisting of: (1) a 60 mil high-density polyethylene (HDPE) primary and secondary liner, (2) a geonet drainage layer and (3) a leachate collection and recovery system (LCRS). The pond subgrade shall consist of a 6" layer of compacted (95% Proctor compaction), 3/8" minus native or natural material, which will be modified by mixing with bentonite or equivalent additive to achieve a saturated hydraulic permeability of no more than  $1 \times 10^{-6}$  cm/sec.

#### Evaporation Ponds:

The evaporation ponds consist of eight operating ponds and one standby pond. Four additional ponds may be constructed in operating years 5 to 7 if needed. Each pond will be approximately 12 acres. The operating depth of the ponds will vary from 30 to 50 feet. The interior of the ponds will be lined with a double liner system consisting of: (1) a 60 mil high density polyethylene (HDPE) primary and secondary liner, (2) a geonet drainage layer and (3) a leachate collection and recovery system (LCRS). The evaporation ponds are jurisdictional dams as defined under A.R.S. § 45-1201.1. and will require plan review and permitting under the ADWR subject to their jurisdiction.

The evaporation pond will provide on-site storage for the neutralized raffinate bleed stream. To prevent build-up of sulfate concentrations in the raffinate, an average of 790 gallons per minute of raffinate returning to the *in-situ* mine will be "bled" and replaced with make-up water. The raffinate bleed stream is neutralized by lime addition in a series of two neutralization tanks prior to discharge to the evaporation ponds. An array of spray nozzles is used in the evaporation ponds to increase available evaporation. Metal hydroxides and sulfates will be precipitated as an amorphous sludge at the bottom of the ponds. BHP Copper Co. predicts that 3.06 million tons of precipitates will be produced during the 15 years of mine life. A conservative density for the precipitates, 35 lbs per cubic foot, was used to calculate the necessary evaporation pond storage volume.

#### Run-Off Pond:

The spill control and run-off pond (run-off pond) serving the SX-EW process area will have a 60-mil HDPE liner over a concrete foundation. The run-off pond has the capacity to contain 110 percent of the largest vessel in the SX-EW plant in addition to the 100-year, 24-hour storm event run-off from the SX-EW facility and process ponds. The SX/EW processing plant and its associated tanks and ancillary components are exempt from APP permitting requirements, pursuant to A.R.S. § 49-250.21 and A.R.S. § 49-250.22.

#### Compliance with Aquifer Water Quality Standards (AWQS):

The Florence Project shall maintain hydraulic control over the *in-situ* mining operation within the aquifer exemption boundaries established by the Environmental Protection Agency (EPA). The Florence Project shall establish hydraulic control by monitoring groundwater gradients, water quality and rates of solution injection and recovery. After mining, the Florence Project will rinse

each mining block with formation water until the groundwater meets AWQS. As part of the APP permitting process, BHP Copper Co. conducted an extensive groundwater modeling effort to predict the behavior of sub-surface solutions within the *in-situ* mine. The results of the modeling indicate that the Florence Project can prevent the migration of mining solutions outside the aquifer exemption boundaries by manipulating injection and recovery rates. ADEQ and EPA have established a comprehensive groundwater monitoring program to ensure that the Florence Project does not exceed Aquifer Water Quality Standards (AWQS) at the points of compliance.

#### **Monitoring Requirements:**

The APP permit requires groundwater and operational monitoring according to Part IV, Tables I through V. The Florence Project will monitor groundwater quality at the points of compliance during the operation of the mine and through the post-closure period. To ensure proper performance, the APP permit requires operational monitoring for the *in-situ* mine and process impoundments.

#### **Points of Compliance (POC):**

The APP permit requires groundwater monitoring at 31 POC monitoring wells. Each well is designated as a hazardous and non-hazardous POC. The APP permit establishes Alert Levels and Aquifer Quality Limits for each of the POCs based on baseline monitoring.

#### **Stormwater and Surface Water Considerations:**

The Florence Project will contain and control the run-on and run-off from a 100-year 24-hour storm event so that no contaminated stormwater will discharge from the site. The run-off pond will contain all stormwater run-on into the facility and all run-off generated within the facility.

#### **Zoning Requirements:**

Mines are exempt from zoning requirements pursuant to A.R.S. § 11-830.

#### **Financial Capability:**

BHP Copper Co. has demonstrated adequate financial capability.

#### **Technical Capability:**

BHP Copper Co. and the personnel responsible for the design, construction, operation, and closure of the Florence Project have demonstrated adequate technical capability.

**ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY**

**AQUIFER PROTECTION PERMIT NO. P-101704**

**RESPONSIVENESS SUMMARY**

May 19, 1997

**Facility:** Florence Project

**Permittee:** BHP Copper  
Florence Project  
14605 East Hunt Highway  
Florence, Arizona 85232

**Comments (C) and Responses (R):**

The Aquifer Protection Program (APP) permit for the Florence Project was public noticed on January 31, 1997. During the thirty-day public comment period, the Arizona Department of Environmental Quality (ADEQ) received both internal (ADEQ) and external (public) comments.

The internal comments consisted of minor non-technical, grammatical suggestions and corrections. These comments will be incorporated into the final permit.

The ADEQ received three external comments by mail during the public comment period. These comments are addressed in the following paragraphs.

A joint public hearing on the ADEQ's Florence Project APP permit and the United States Environmental Protection Agency's (USEPA) Underground Injection Control (UIC) permit was held on March 6, 1997, in Florence Arizona. Comments provided by two individuals during the hearing are addressed in the following paragraphs. No comments requiring a response from the ADEQ were received in the two week open comment period following the public hearing.

Comments from the public comment period and the public hearing are addressed as follows:

Comment (C) received during the public comment period from Bill Hawes, Assistant Mine Inspector, Office of the Arizona State Mine Inspector; response (R) summarized by Shirin Tolle:

**C1:** Some mathematical errors (mainly in the area of conversion factors) are noted in the 125 page state document (primarily on pages 5 and 6).

**R1:** The noted corrections have been made to the permit.

Comment (C) received during the public comment period from Joe R. Williams, Research Soil Scientist, Technical Assistance and Technology Transfer Branch, National Risk Management Research Laboratory, USEPA; response (R) summarized by Shirin Tolle:

**C2:** "The Technology Support Center (TSC) through the Center for Subsurface Modeling Support (CSMoS) has reviewed the Draft Area Permit submitted for public comment on February 6, 1997. The TSC is in agreement that requiring the modeling post-audit in the permit is a prudent and conservative approach. At the time of the post-audit, the conceptual and numerical model can subsequently be modified to reflect any changes deemed necessary through the evaluation of on-site data. The only concern that the TSC might have is that a follow-up post-audit later in the 15-year life of the mine might be appropriate. As an example, significant changes may not have occurred in the 5-year time frame that may occur in a 10-year time frame. Therefore, a second formal post-audit may be warranted that would account for the longer time frame."

**R2:** A requirement for a formal 10-year post-audit of the subsurface groundwater model has been incorporated into the permit in Part II.J.

Comment (C) received during the public comment period from John Kline, Project Manager, Florence Project; (R) summarized by Shirin Tolle:

**C3:** "BHP Copper requests specific language that clearly states that an exceedance of an AQL at the point of compliance will not be considered a violation of the permit as long as BHP Copper complies with the contingency plan requirements in Subsection F of Part II of the Permit. Part VII of the permit also needs to be amended to state this position."

**R3:** Under A.R.S. § 49-243.K., the Director has the authority to include monitoring requirements and discharge limitations in APP permits. If a violation of a permit condition or discharge limitation occurs, the Director may issue a compliance order under A.R.S. § 49-261.A. Under A.R.S. § 49-262.A., the Director can request through the attorney general, a temporary restraining order, a preliminary injunction, a permanent injunction or any other relief necessary to protect public health. Exceedances of aquifer quality limits (AQLs) are subject to compliance action under A.R.S. § 49-261.A or A.R.S. § 49-262.A. BHP Copper's efforts to implement contingency actions to address AQL exceedances will be considered by the ADEQ if a compliance action is pursued. However, the permit cannot contain language that would prevent the ADEQ from taking compliance actions if needed to protect public health and the environment. The requested change was not incorporated into the permit.



**C4:** "The establishment of sulfate as an 'early warning indicating a potential violation of an Aquifer Water Quality Standard or any permit condition' as stated in Part V is merely to utilize an easily identifiable ion as an early warning system. There is no numeric aquifer water quality standard for sulfates and sulfate is only intended to be an indicator that there is a potential loss of solution from the leach system. BHP Copper requests that a notation as such be included wherever an AQL for sulfate is listed as the State has not adopted a regulatory standard for sulfate"

**R4:** The permit language states clearly that BHP Copper is required to monitor sulfate only as an indicator of potential violations of Aquifer Water Quality Standards or other permit conditions. Sulfate is not included as an AQL in the Level I and Level II groundwater compliance monitoring tables. At this time, there is no numeric Aquifer Water Quality Standard for sulfate established under Arizona Administrative Code (A.A.C.) R18-11-406. If warranted, the ADEQ may establish a permit limit for sulfate based on the narrative standard expressed in A.A.C. R18-11-405 as follows:

- "A. A discharge shall not cause a pollutant to be present in an aquifer classified for a drinking water protected use in a concentration which endangers human health.
- B. A discharge shall not cause or contribute to a violation of a water quality standard established for a navigable water of the state.
- C. A discharge shall not cause a pollutant to be present in an aquifer which impairs existing or reasonably foreseeable uses of water in an aquifer."

The information submitted by BHP Copper during the APP permit application process has established that there is no necessity for invoking the narrative standard for sulfate at the Florence Project. Hydrologic modeling has established that the Florence Project will be operated outside of the influence of any existing or anticipated domestic drinking water wells. The permitting process has established that discharge from the Florence Project will not endanger human health or impair existing or reasonably foreseeable uses of water in the aquifer. On the basis of these conclusions, there is no need to include a notation on sulfate in the permit. The requested change was not incorporated into the permit.

**C5:** Refer to Part II.C.3 of the APP permit -

"As you know, the State mine inspector has claimed jurisdiction over these ponds and according to Bill Haws, Assistant State Mine Inspector, may develop an MOU with ADWR on this issue. BHP Copper requests that the words 'subject to their jurisdiction' be added after ADWR to clarify the issue. BHP Copper agrees to seek plan review from ADWR, but will submit the Dam Safety permit under

the caveat that BHP Copper believes that jurisdictional control should be under the State Mine Inspectors office."

- R5:** The last sentence in the first paragraph of Part II.C.3 has been changed to state the following:

"The evaporation ponds are jurisdictional dams as defined under A.R.S. § 45-1201.1 and will require plan review and permitting under the ADWR subject to their jurisdiction."

- C6:** Refer to Part II.C.3.b of the APP permit -  
"BHP Copper requests that this condition be dropped. The limiting condition is the capacity of the ponds themselves."

- R6:** Part II.C.3.b. of the APP permit reads as follows:

"Specific construction and operational activities for the evaporation ponds shall consist of the following: ...

- b. the maximum bleed flow rate shall be maintained at 1,200 gallons per minute."

This requirement was based on the information submitted in the APP application. It is understood by ADEQ that BHP Copper may need the ability within its operation to increase the bleed flow rate above 1,200 gallons per minute in special circumstances.

The permit language has been changed to read as follows:

"Under normal operating conditions the maximum bleed flow rate shall be 1,200 gallons per minute."

- C7:** Refer to Part II.C.3.c of the APP permit -

"BHP Copper requests that the words 'or other agency with jurisdiction' be added after ADWR in case an MOU is developed between the State Mine Inspectors office and ADWR."

- R7:** This change has been incorporated into the permit.

- C8:** Refer to Part II.C.3.d of the APP permit -

"BHP Copper requests that this condition be dropped or modified as c. and e. in this section may require the footprint of the ponds to be modified in accordance with ADWR requirements. An alternative is to delete the words (sic) 'not exceed' and replace them with 'approximate'."

**R8:** Part II.C.3.b. of the APP permit reads as follows:

"the maximum areal extent of the evaporation ponds shall not exceed the footprint shown in Drawing No D-10-211-001 of the approved design plans provided in the Addendum referenced in PART V".

Design plans showing the areal extent and construction details for the proposed evaporation ponds were submitted to the ADEQ with the Florence Project APP application. The evaporation ponds are permitted as discharging facilities based on the information submitted in the APP application. Under A.A.C. R18-9-121 APP permits may be modified to accommodate material and substantial alteration to a permitted facility.

As defined under A.R.S. § 49-201.19, any change to a permitted facility resulting in "a significant increase or adverse alteration in the characteristics or volume of the pollutant discharged" requires a major modification of the permit. If ADWR requests an increase in the areal extent of the evaporation ponds, BHP Copper will need to submit modified design plans to the ADEQ. The permit can be modified under the rules for minor modification at A.A.C. R18-9-121.4 if BHP Copper demonstrates that the increase in areal extent will not result in a significant increase in pollutants from the evaporation ponds. The requested change was not incorporated into the permit.

**C9:** Refer to Part II.C.3.g. of the APP permit -

"BHP Copper requests that the work (sic) 'shall' be changed to 'may'. This still leaves the decision to the APP permit officer, but allows that decision to be made at the time of the request. BHP Copper sees no need to lock in a future permit officer to a fixed decision."

**R9:** Part II.C.3.g. of the APP permit reads as follows:

"construction of additional evaporation ponds after commencement of operations at the facility shall constitute a major modification of the APP permit."

Under the APP permit, discharging facilities are permitted based on the design drawings submitted in the APP application. Once a permit is issued, A.A.C. R18-9-121.C.1 allows modification of the permit to accommodate substantial design changes to permitted facilities. The addition of a new lined impoundment falls under the definition of a major modification stated at A.R.S. § 49-201.18. The construction of additional evaporation ponds at the Florence Project will result in only minor changes to the permit. The major modification is a simple one and will require only the submittal of design drawings and public notice. The requested change was not incorporated into the permit.

**C10:** Refer to Part II.D.3 of the APP permit -

"Mine blocks may be redefined as the process is optimized within the permitted area. The nature of *in-situ* mining is that blocks will not come on as large units but as rows or sections of mine zones. BHP Copper requests that the wording be changed to make the sentence clearer as written below:

- '3. Injection of leach solutions on a commercial basis may not be commenced until all coreholes and other boreholes **not related to the in-situ leaching** operation but within 500 feet of an active mining area be abandoned in accordance with the pre-operational well abandonment plan submitted with the APP application' "

**R10:** Part II.D.3. of the APP permit reads as follows:

"Injection of leach solutions on a commercial basis may not be commenced until all coreholes and wells within 500 feet of the active mine block have been abandoned...."

The intent of the permit language is to prevent coreholes, boreholes and poorly cased wells from acting as conduits of process solutions into the upper and lower basin fill units. This language does not apply to cased wells that have met the requirements for mechanical integrity testing (MIT) as outlined in the UIC permit issued to the Florence Project. Construction of the *in-situ* mine may result in wells that cannot pass the MIT requirements. The permit language is intended to address these wells and requires that they be abandoned according to the well abandonment plan. The requested change has not been incorporated into the permit.

**C11:** Refer to Part II.E.1.b. of the APP permit -

"BHP Copper requests that the time be changed to 90 days. In addition, BHP Copper requests that another sentence be added as the results of the investigation may result in a monitoring change which should not result in a major modification. BHP Copper requests the following sentence be added:

**'Results of this study may lead to changes in monitoring requirements but would not constitute a major modification to this permit.'**

**R11:** Under A.A.C. R18-9-121, the Director may make minor modifications to the individual APP permit to increase the frequency of monitoring or reporting. The requested change to 90 days has been made.

The following sentence has been added to the end of the paragraph as follows:

**"Changes to the monitoring program which act to increase the level of monitoring as a result of this characterization shall be considered a minor modification of the permit."**

**C12:** Refer to Part II.E.3.c.(1) of the APP permit -

"BHP Copper questions the inclusion of words 'and their subsequent revisions:' at the end of the first paragraph. BHP Copper believes that the permit conditions are set at the time of this permit and should not be required to re-permit the facility based upon subsequent revisions."

**R12:** The requested deletion has been made to the permit. The referenced sentence now reads as follows:

"Prediction intervals are defined by and shall be calculated by the methods given in any of the following documents."

**C13:** Refer to Part II.E.4.a.(1) of the APP permit -

"Under RCRA rules, records need only be kept for 3 years. BHP Copper requests that ten years be reduced to 3 years to parallel other regulatory limits."

**R13.** Part II.E.4.a.(1) states as follows:

"The pollution control structures shall be inspected for the items listed in Part IV, Table IV. A log of these inspections shall be kept at the facility or other approved location for ten years from the date of each inspection, available for review by ADEQ personnel."

The language under A.A.C. R18-9-112.D states the following:

"An individual Aquifer Protection Permit shall require that a permittee retain or have access to a monitoring record made pursuant to subsection (C) for a period of 10 years after the date of the sample or measurement."

The requested change was not incorporated into the permit.

**C14:** Refer to Part II.E.4.c of the APP permit -

"BHP Copper requests that the last sentence read:

'This information shall be kept on-site for the life of the facility unless otherwise approved by ADEQ'.

BHP Copper reserves the right to request changes in either the location of storage of information or the quantity stored. As BHP Copper goes to paperless transactions, much information will be archived on computers and may not be on-site.

**R14:** Part II.E.4.c of the APP permit reads as follows:

"The average daily volume discharged to the evaporation impoundments shall be monitored and recorded daily. This information shall be kept on-site for the operating life of the facility."

Records pertaining to facility inspections and operations must be available on-site for the benefit of APP compliance inspectors and facility personnel. Because APP permits operate for the lifetime of a facility and are not renewed, records of facility inspections and operations must either be long-term or for the lifetime of the facility. The permit language does not specify the format for keeping facility records on-site. Records may be stored electronically as long as this information is accessible and can be hard-copied at the site. The requested change was not incorporated into the permit.

A clarifying change to this permit language was made based on a conversation between Jarrel Southal of Brown and Caldwell and Shirin Tolle of ADEQ on April 23, 1997.

The first sentence of the paragraph now reads as follows:

**"The total average daily volume discharged to the evaporation impoundments shall be monitored and recorded daily."**

**C15:** Refer to Part II.F.1, subsections a and b of the APP permit -

"BHP Copper has revisited the USEPA Guidelines and found that a 2 mm hole (0.08") is normally expected for each acre of pond area which is above the level set in the permit as the action leakage rate by the ADEQ. The action leakage rates are set far below that recently permitted at Pinto Valley at 1250 gal/acre/day. The Pinto Valley permit indicates that for less than that amount no action is necessary. The PLS and raffinate ponds meet the BADCT guidance design criteria as recommended in the 1996 Guidance Document issued by the ADEQ. The design by Fluor Daniel Wright Engineers has engineered a leakage control pump system at 20 gpm necessary to remove any leakage between the liners of up to an average of one 11 mm hole per acre (10,325 gal/acre/day or 7.17 gpm). Consequently, the action leakage rate should be set at a level based upon the engineered capacity to maintain a minimum head on the lower liner. BHP Copper requests that the action leakage rate be set at a value at least twice that of Pinto Valley due to the submitted BADCT design since the sump pump has a capacity capable of pumping the 10,325 gallons per acre per day or 4 times the 2,500 gallon per acre per day rate requested by BHP Copper at similar heads.

**R15:** Part II.F.1.a.(1) of the APP permit states:

"The permittee shall initiate the following actions within 24 hours of becoming aware of the exceedance of the action leakage rate of 96.0 gal/day per wetted acre at the PLS and raffinate pond leak detection sumps."

Part II.F.1.b.(1) of the APP permit states:

"The permittee shall initiate the following actions within 24 hours of becoming aware of the exceedance of the rapid leakage rate of 483.0 gal/day per wetted acre at the PLS or raffinate pond leak detection sump."

The action leakage rate (ALR) and rapid leakage rate (RLR) stated in the permit are based on a pond depth of 20 feet. The ALR is based on one 0.04 inch diameter hole per acre and the RLR rate is based on one 0.08 inch diameter hole per acre. A description of the methodology used to calculate the ALR and RLR was transmitted to BHP Copper from the ADEQ on January 31, 1997, in a document entitled "Transmittal of the Public Notice Draft of the Florence Project Aquifer Protection Program (APP) permit". The equation used to calculate the ALR and RLR in this document is as follows:

$$Q = C_b \times a \times (2 \times g \times h)^{0.5}$$

$C_b$  = orifice coefficient = 0.6

$a$  = area of hole in primary HDPE liner

$g$  = acceleration of gravity

$h$  = head above primary HDPE liner

For the ALR and RLR in the permit, the hole diameters are based on Section 7.4.2, of the California Mining Association - Mine Waste Management text. Section 7.4.2 of the Mine Waste Management text states that one 0.04 to 0.08 inch diameter hole can be expected per acre of liner installation. Based on this statement, the ALR in the permit was based on a 0.04 inch diameter hole and the RLR was based on a 0.08 inch diameter hole. A 11 mm (0.43 inches) diameter hole was chosen as the basis for the reportable ALR for the Pinto Valley APP permit. APP Project Engineer Michael Greenslade based this decision on the use of prescriptive best available demonstrated control technology (BADCT) in the design of the Gold Gulch PLS pond. Prescriptive BADCT is outlined in the Final Draft - Arizona Mining BADCT Guidance Manual dated August 1996 (BADCT Manual) and requires implementation of optimum engineering design standards. Because prescriptive BADCT was used for the Gold Gulch Pond, Mr. Greenslade assumed that a larger ALR based on a larger diameter hole was appropriate. In the APP permit for the Carlota Copper Project, the ALR for the heap leach impoundment is based on a 3 mm (0.118 inch) diameter hole due to the fact that the liner system is not a composite liner (i.e., not prescriptive BADCT). The applicable reference for use of these hole diameters can be found on page 59 of *Geotextiles and Geomembranes 8 (1989) - Leakage Through Liners Constructed With Geomembranes* by J.P. Giroud and R. Bonaparte. The Florence Project PLS and raffinate ponds have been designed to meet prescriptive BADCT requirements. The reportable ALR for Florence should reflect the hole diameter stated in the previously issued APP permit for the Pinto Valley Mine due to the use of prescriptive BADCT in the engineering design of the facilities. The permit language will be revised to use a 3 mm (0.118 inch) diameter hole for a non-reportable ALR and the 11 mm (0.433 inch) diameter hole for the reportable RLR.

The ALRs and RLRs stated for the PLS and raffinate ponds in Table II.C of the permit will also be revised.

Part II.F.1.a.(1) of the APP permit will be revised to state:

**"The permittee shall initiate the following actions within 24 hours of becoming aware of the exceedance of the action leakage rate of 1,034.17 gal/day per wetted acre at the PLS and raffinate pond leak detection sumps. "**

In the event of an exceedance of the ALR, the contingency plan in Part II.F.1.a.(1) will apply. The reporting requirement for ALR exceedances in Part II.F.1.a.(2) has been removed from the permit.

Part II.F.1.b.(1) of the APP permit has been revised to state:

**"The permittee shall initiate the following actions within 24 hours of becoming aware of the exceedance of the rapid leakage rate of 13,573.00 gal/day per wetted acre at the PLS or raffinate pond leak detection sump."**

In the event of an exceedance of the ALR, the contingency plan in Part II.F.1.b.(1) will apply. Part II.F.1.b.(2) will require BHP Copper to report exceedances of the RLR to APP Compliance.

**C16:** Refer to Part II.F.1 subsection c and d of the APP permit -

"The BADCT design requirements for the evaporation pond include a single liner with a compacted fill base. BHP Copper has submitted a design which greatly exceeds the BADCT Guidance Document recommendation due to the addition of a secondary liner system. The action leakage rate is extremely low when the submitted design is considered. A single 2 mm hole will produce 611 gal/acre per day with a 50 foot head. The stated action level of 153 gal/acre per day is onerous and set at a rate about one fourth of that to be anticipated in normal operations. The addition of the second liner, coupled with the design pumping capacity in the LCRS sump of 200 gpm far exceeds BADCT and BHP Copper requests relief from this permit requirement. BHP Copper requests that either no action limit be set due to the design or a more reasonable limit set based upon the engineered controls in the pond LCRS system. BHP Copper is willing to accept an action rate in line with its designed collection capacity. BHP Copper suggests a level of 2,500 gallons per acre per day which BHP Copper believes is reasonable in light of the cost of installing a secondary liner system.

**R16:** Based on BHP Copper's comments on the evaporation pond ALR and RLR, the permit language will be revised to use a 3 mm (0.118 inch) diameter hole for a non-reportable ALR and the 11 mm (0.433 inch) diameter hole for the reportable RLR. The ALRs and RLRs for the evaporation ponds in Table II.C of the permit will also be revised.



Part II.F.1.c.(1) of the APP permit will be revised to state:

"The permittee shall initiate the following actions within 24 hours of becoming aware of the exceedance of the action leakage rate of 1,664.37 gal/day per wetted acre at the evaporation pond leak detection sumps. "

In the event of an exceedance of the ALR, the contingency plan in Part II.F.1.c.(1) will apply. The reporting requirement for ALR exceedances in Part II.F.1.c.(2) has been removed from the permit.

Part II.F.1.d.(1) of the APP permit has been revised to state:

"The permittee shall initiate the following actions within 24 hours of becoming aware of the exceedance of the rapid leakage rate of 21,976.00 gal/day per wetted acre at the evaporation pond leak detection sumps."

In the event of an exceedance of the ALR, the contingency plan in Part II.F.1.d.(1) will apply. Part II.F.1.d.(2) will require BHP Copper to report exceedances of the evaporation pond RLR to APP Compliance.

C17: Refer to Part II.G of the APP permit -

"BHP Copper recommends changing the word 'Program' to 'Mining Unit' and amending the last sentence in this paragraph to read:

'Notification of the temporary cessation ... unless otherwise specified in the permit or ...'  
The addition of these words give the option to changing this condition to the APP permit officer.

R17: The first sentence of Part II.G. of the APP permit states the following:

"The permittee shall notify the ADEQ Aquifer Protection Program in writing prior to temporary cessation of operation at the facility."

The use of the term 'Aquifer Protection Program' has been used in the permit to prevent confusion if the name of the APP Mining Unit is changed. This could be the case if the ADEQ is re-organized. This permit will always be administered under the APP program, so this title is maintained throughout the permit. The requested change was not incorporated into the permit.

Notification of temporary cessation is required under A.A.C. R18-9-116.A which states:

"An individual Aquifer Protection Permit shall require that the permittee notify the Director before any temporary cessation of operations at the facility. An individual Aquifer Protection

Permit shall specify any measures to be taken by the permittee if there is any temporary cessation of operations at the facility."

Therefore, this notification is required under rule and not at the discretion of the APP permit officer. The requested change was not incorporated into the permit.

**C18:** Refer to Part II.H.2, third paragraph of the APP permit -

"BHP Copper is being regulated on AWQS and not sulfate. The sulfate is merely used as an expedient method to minimize assay cost. The references to sulfate should be dropped and replaced by AWQS, since BHP Copper will test to insure that AWQS are met. BHP Copper requests the following substituted language in bold:

'When all individual well concentrations are below the **AWQS levels**, hydraulic control will be discontinued for 90 days. At the end of the 90 day period, the headers will be re-sampled and if the concentrations remain below **AWQS**, then the permittee...."

**R18:** The referenced permit language reads as follows:

"When all individual well concentrations are below the indicator sulfate concentration, hydraulic control will be discontinued for 90 days. At the end of the 90-day period, the headers will be re-sampled and if sulfate concentrations remain below the indicator sulfate concentration, then the permittee may cease all rinsing and monitoring activities."

This method for mine block closure was established as part of the permit negotiations between BHP Copper, the ADEQ and USEPA and was agreed upon previously by all three parties. The geochemical modeling submitted by BHP Copper in the APP application supports the use of sulfate as an indicator. The data shows that by the time sulfate concentrations in a block fall below 750 mg/l of sulfate, all other aquifer water quality standards (AWQS) in that same block will be met. ADEQ finds no technical reason why use of the sulfate indicator is inappropriate. The requested change was not incorporated into the permit.

**C19:** Refer to Part II.H.3 of the APP permit -

"BHP Copper requests that the one year pre-closure notification be changed to 180 days. BHP Copper believes that the one year notification period is excessive and that the conditions of closure allow an adequate response by ADEQ within the 180 day period".

**R19:** The permit language under Part II.H.3 reads as follows:

"The permittee shall submit a complete characterization of the evaporation pond precipitates and a detailed closure plan for the evaporation ponds no later than 1 year prior to the commencement date for facility closure."

The regulatory requirements for closure are stated under A.A.C. R18-9-116. Under A.A.C. R18-9-116.B, the permittee must notify the Director of the permittee's intent to close a facility. Under A.A.C. R18-9-116.C the permittee is required to submit a closure plan within 90 days of the notification of closure. Under A.A.C. R18-9-116.D, ADEQ then has 60 days to approve or reject the closure plan. At a minimum, the rule at A.A.C. R18-9-116 requires the permittee to inform ADEQ 150 days prior to a closure. BHP Copper's request for notification 180 days prior to closure satisfies the statutory time frame. The requested change has been incorporated into the permit.

**C20:** Refer to Part II.K.1 of the APP permit -

"BHP Copper requests that the wording be changed to '60 days prior to construction'. A 60 day period should be adequate for ADEQ to review the results of the test work, and allows for input by ADWR and the State Mine Inspectors office during their reviews. ADWR may not be able to complete their review within 60 days of the permit being issued."

**R20:** The referenced permit language reads as follows:

"Within 60 days of the effective date of the permit, the permittee shall submit to the ADEQ Aquifer Protection Permit Program the results of all soil testing on borrow sources and mixed soil/bentonite mixtures."

As of this time, BHP Copper has informed the APP Mining Unit that the soil testing data has been completed. Therefore, this data can easily be submitted to the ADEQ within 60 days of the effective date of the permit. The Arizona Department of Water Resources (ADWR) does not have to review or approve the data before it can be submitted to ADEQ. In addition, the earlier the data is submitted to ADEQ, the quicker it can be reviewed and approved. The data should be submitted for review as soon as possible in order not to interfere with projected construction schedules for the Florence Project. The requested change has not been incorporated into the permit.

**C21:** Refer to Part II.K.2, subsections a, b, c and d of the APP permit -

"BHP Copper requests that wherever the 'effective date of the permit' is given, change it to '60 days prior to start of construction' for the same reason listed above. BHP Copper has agreed to review by ADWR but cannot control their schedule. The requested re-wording allows both ADWR and ADEQ adequate time for response."

**R21:** Part II.K.2, subsections a, b, c and d of the APP permit requests information on the construction of the evaporation ponds, i.e., quality control, geotechnical

engineering, stability analysis and differential settlement. This information needs to be submitted to ADEQ for review with enough time for the information to be reviewed and revised before commencement of construction. It is ADEQ's understanding that the requested information exists and is being put into a final form for transmittal to ADEQ. Therefore, BHP Copper should be able to submit the information within 60 days of the effective date of the permit. Once again, ADEQ's review of the information is not dependent on ADWR's review. The requested language was not incorporated into the permit.

**C22:** Refer to Part II.K.2.e of the APP permit -

BHP Copper requests that a line be added to the end of this paragraph that states:  
'If ADEQ does not respond within 30 days, the submittal is deemed approved.'

ADEQ should be able to respond within 30 days and a positive action requires additional work on the part of the ADEQ permit officer.

**R22:** The referenced permit language reads as follows -

"Within 60 days of the effective date of the permit, the permittee shall submit to the ADEQ, Aquifer Protection Permit Program, a comparison between the total, maximum and differential settlement expected beneath the evaporation ponds and the elongation strength and flexure properties of the liner and leachate collection pipe system. ADEQ approval of the submittal shall be required prior to commencement of evaporation pond construction."

The APP application for the Florence Project did not include the geotechnical data necessary for establishing BADCT for the evaporation ponds. This deficiency in the APP application was noted by the APP Mining Unit in a technical review letter dated December 11, 1996. Under A.A.C. R18-9-115.C, an individual APP permit cannot establish a compliance schedule for a new facility unless the facility complies with BADCT. In order to comply with A.A.C. R18-9-115.C, the APP Mining Unit must review the information submitted under the compliance schedule and determine if the evaporation ponds meet BADCT. BHP Copper's request, if incorporated into the permit, could result in a violation of A.A.C. R18-9-115.C by allowing the evaporation ponds to be constructed without a determination of BADCT. The requested change has not been incorporated into the permit.

**C23:** Refer to Part II.K.3 of the APP permit -

"BHP Copper may or may not mine in the area of the underground workings and shafts or may modify its *in-situ* mining procedure as the process becomes optimized. BHP Copper therefore requests that the working (sic) of the first sentence be modified to read:

'Sixty days prior to commencement of leaching within 500 feet of the shafts or underground workings of the existing underground mine, the permittee shall submit the following

information on *in-situ* solution recovery from the... to the ADEQ Aquifer Protection Permit Mining Unit.'

**R23:** The referenced permit language reads as follows:

"Sixty days from the effective date of the permit, the permittee shall submit the following information on *in-situ* solution recovery from the underground mine to the ADEQ Aquifer Protection Permit Program."

The ADEQ agrees that it is reasonable to submit this information prior to commencement of *in-situ* recovery from the underground mine. However, 60 days is not enough time for ADEQ to review the information and for BHP Copper to incorporate any requested changes. The permit language has been incorporated as requested with the exception that the information will be required 180 days rather than 60 days prior to commencement of operations.

The permit language has been revised as follows:

"One hundred eighty (180) days prior to commencement of leaching within 500 feet of the shafts or underground workings of the existing underground mine, the permittee shall submit the following information on *in-situ* solution recovery from the underground mine to the ADEQ Aquifer Protection Permit Program."

**C24:** Refer to Part II.K.3.d of the APP permit -

"BHP Copper requests that the words 'water quality monitoring and contingency' be struck. The goal is to ensure that the workings do not act as a conduit to the Basin Fill Units which is adequately stated in the last part of this sentence and these plans may not be needed based upon the plan submitted to ADEQ at the time when leaching approaches 500 feet of the shafts or underground workings."

**R24:** The referenced permit language reads as follows:

"....a water quality monitoring and contingency plan adequate to ensure that the underground working do not act as conduits for raffinate into the Basin Fill Units."

At a minimum, the underground shaft will need to be monitored for increases in indicator parameters such as conductivity or sulfate during *in-situ* recovery in the underground mine. This type of monitoring may be adequate to address this permit condition based on the information submitted under Part II.K.3 of the APP permit. The requested change was not incorporated into the permit.

Comments (C) received during the public hearing from Col. R. B. Rodke, private citizen, and transcribed in the 'Reporter's Transcript of Proceedings' dated March 3, 1997 (Hearing Transcript); response (R) summarized by Shirin Tolle:

**C25:** Refer to page 16, second paragraph of the Hearing Transcript -

"My concern was the fact that these 2,000 core holes out there were not properly plugged and that the water, the acid, would be coming up into the water."

**R25:** Pursuant to Section II.D.3. of the APP permit, BHP Copper may not commence the injection of leach solutions until all coreholes within 500 feet of a proposed mine block are closed, i.e. 'plugged', in accordance with the pre-operational well abandonment plan. ADEQ is satisfied that the pre-operational well abandonment plan incorporated into the permit is adequate to address this concern.

**C26:** Refer to page 16, third paragraph of the Hearing Transcript -

"My concern was what would it do if flow of the water comes from the southeast down to the airport and north -- this is Hallapane's (phonetic) water for Continental -- and goes through this prospect to feed the corner of Felix and Arizona Farms Road, and goes north west to Queen Creek, that was the path of the Old Gila River millions and millions of years ago."

**R26:** During the public hearing, ADEQ understood that this comment is a reference to the paleo-channel of the Gila River and not to surface flow. Therefore, this comment refers to the question of controlling the injected solution so that it will not flow beyond the boundaries of the mine area and into the paleo-channel of the Gila River. The APP permit requires the Florence Project to maintain hydraulic control of injected solutions so that AWQS are achieved at the down-gradient point of compliance (POC) monitoring wells. In the APP application for the Florence Project, hydraulic control of *in-situ* solutions was demonstrated by hydrologic modeling. The Florence Project APP permit reinforces the results of hydrologic modeling by establishing specific permit conditions for maintaining hydraulic control of *in-situ* solutions.

In order to first establish that hydraulic control of *in-situ* solutions was possible, BHP Copper initiated an extensive on-site data collection and hydrologic modeling program. In order to model the movements of *in-situ* solutions, BHP Copper first collected site specific hydrologic and geologic data from hundreds of on-site coreholes and numerous existing and developed monitoring wells. This information was then used as the baseline data for the groundwater flow model and solute transport model. Results from the modeling runs were presented in the APP application for the Florence Project dated January 22, 1996.

The application included modeling runs of worst-case scenarios suggested by USEPA, ADEQ and the Gila River Indian Community. Examples of worst-case scenarios include the maximum probable flood of the Gila River, maximum pumping of adjacent drinking water and irrigation wells and the malfunction of

recovery wells within the mine block. The results of the modeling runs showed no impacts from *in-situ* solutions either to the Gila River or to adjacent agricultural and drinking water wells under worst case conditions.

The results of the hydrologic modeling were used to establish the Florence Project's discharge impact area (DIA) after closure of the mine. Based on BHP Copper's modeling of the injection and recovery well system, the discharge impact area thirty years after closure of the mine is shown in Volume I, Figure 5 of the Florence Project APP application. A discussion of the DIA was included in Volume I, Section 5.2.2 of application. The modeling predicts that the maximum boundary of the DIA, represented by a plume of slightly elevated sulfate levels, will extend 1,700 feet north of the mine boundary thirty years after closure. The modeling shows that the DIA thirty years after closure will not impact the Gila River or adjacent agricultural or drinking water wells. The modeling also shows that although sulfate levels will be elevated slightly in the DIA outside the mine boundary, AWQS will continue to be met at the POCs thirty years after closure.

In addition to the hydrologic modeling provided in the APP application, the APP permit as issued contains many requirements and provisions related to hydraulic control of *in-situ* solutions. Pursuant to Part II.E.1 of the APP permit, BHP Copper is required to conduct a 90-day test to demonstrate the ability to maintain hydraulic control and to demonstrate the effectiveness of the "four-pair" hydraulic control monitoring network before commencing operations. BHP Copper may not commence commercial operations until its ability to maintain hydraulic control has been adequately demonstrated.

Once commercial operations commence, Section II.F.2.a of the APP permit requires BHP Copper to take contingency actions whenever any of the monitoring wells are inoperable for more than 24 hours or whenever the monitoring wells indicate the possibility that hydraulic control was lost for any 24-hour period. These contingency actions include adjusting the flow rates, inspection of equipment, pressure testing of suspect wells and initiating repairs. Part II.F.2.b of the APP permit requires more rigorous contingency actions if hydraulic control in an operating mine block is lost for more than 72 consecutive hours. In this case, BHP Copper is required to immediately cease injection in the affected mine block. BHP Copper must then operate the recovery wells in the mine block until the amount recovered is in excess of the amount of fluid injected during the 72-hour period. Once this is done, BHP Copper must then verify the proper operation of all facilities within the mining block and perform necessary repairs.

In addition to the monitoring of hydraulic control within the area of injection, BHP Copper will also be responsible for monitoring groundwater quality as provided in Section II.E.4 of the Permit. The groundwater monitoring programs establishes alert levels and aquifer quality limits for the POC wells.

Section II.H.2 of the Permit sets forth BHP Copper's responsibilities with respect to closure of active *in-situ* mine blocks. Florence has proposed a "close as you go" process where a mine block to be closed will be re-circulated with fresh water until AWQS are achieved.

ADEQ has determined that the demonstration of hydraulic control provided in the APP application for the Florence Project is technically sound. ADEQ is satisfied that this demonstration, combined with the APP permit requirements, is adequate to protect the Gila River and the Basin Fill aquifer.

**C27:** Refer to Page 17, first paragraph of the Hearing Transcript -

"My concern is the effect that this operation would have with this acid leaking into the water supply".

**R27:** This comment is similar to comment **C26** regarding hydraulic control of injected solutions. Please refer to response **R26**.

**C28:** Refer to page 17, first paragraph of the Hearing Transcript -

"My only concern is that they are going to ruin the water supply from here on out"

**R28:** This comment is similar to comment **C26** regarding hydraulic control of injected solutions. Please refer to response **R26**.

**C29:** Refer to page 18, second paragraph of the Hearing Transcript -

"I said , Gentlemen, that's a fine project if it (hydraulic control) would work, but what if it doesn't work, and who's going to monitor the wells and tell them when they need to start pulling more. When they pull more water they are going to be affecting all these farmers and all this area around here, and they are going to have to lower their wells or run out of water." Parentheses added for clarification.

**R29:** BHP Copper has prepared a detailed monitoring plan to detect any potential loss of hydraulic control of the injected solutions and a contingency plan to implement appropriate measures to remedy the situation in a timely manner. Please refer to response **R26**.

**C30:** Refer to page 20, third paragraph of the Hearing Transcript -

"Just closing. I think in all honesty that BHP Copper, if this deal -- if they're so sure this deal would work, they should not be hesitant to put a \$500 million bond,



that if the deal doesn't work, they will be responsible for that, not just their word, not just their word."

**R30:** Under A.R.S. 49-243.N and A.A.C. R18-9-108.B.8, BHP Copper must provide a demonstration of financial capability to be reviewed and approved by ADEQ. In a memo to APP Project Officer Shirin Tolle dated October 17, 1996, Manuel Sainz of the Financial Services Unit of ADEQ, reviewed and approved the financial information submitted by BHP Copper. ADEQ is satisfied that BHP Copper has met the financial capability demonstration for the Florence Project APP as required under both A.R.S. 49-243.N and A.A.C. R18-9-108.B.8.

Comment (C) received during the public hearing from Mr. Leslie A. Wakefield, private citizen, as transcribed in the 'Reporter's Transcript of Proceedings' dated March 3, 1997 (Hearing Transcript); response (R) summarized by Shirin Tolle:

**C31:** Refer to page 20, paragraph five of the Hearing Transcript -

"I do not want to see the State grant a variance for any pollutants that they (i.e., the Florence Project) do cause. In other words, if you buy property in certain areas in Maricopa county you have to sign a statement stating that you will not sue Motorola for any birth defects, et cetera. ... I don't believe the State legislature should make any move to preclude people who have suffered loss from suing Magma (i.e., BHP Copper) or the State ..."

**R31:** As this is a response to comments on the APP permit for Florence, this response can only pertain to violations of that permit and the consequences as they pertain to BHP Copper. The scope of this response document cannot address private citizen suits against BHP Copper. However, the following discussion outlines BHP Copper's liability under the APP permit.

The statute at A.R.S. 49-263.A. states the following:

" it is unlawful to: ...

2. Fail to monitor, sample or report discharges, as required by a permit...
3. Violate a discharge limitation specified in a permit ...
4. Violate a water quality standard."

Under A.R.S. 49-262 the Director of ADEQ, through the State Attorney General, may seek injunctive relief, civil penalties and recovery of litigation costs for violations of APP permit conditions or discharge limitations. Injunctive relief may consist of a temporary restraining order, a preliminary injunction, a permanent injunction or any other relief necessary to protect the public health. The ADEQ is not aware of any proposed legislation that would reduce BHP Copper's liability in the event that the company failed to comply with the terms of its permit.

There is no other way to do this. The only way to do this is to do it.

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